ADDENDUM NO. 2

State Aid Project 159-120-005
City No. 6206-2-11 (J7910)
J7910 Construction of Bridge No. 55591 and Approach Grading on 6th Street SE over Bear Creek

ISSUED: (August 22, 2014)

BIDS OPENED AT: August 27, 2014
YOUR BID MUST ACKNOWLEDGE RECEIPT OF THIS ADDENDUM.

The following additions, corrections, or modifications are hereby made a part of the Contract Documents for the above referenced project.
The Proposal & Plan shall be revised as follows:

PROPOSAL

1. **Revise S-20 Determination of Contract Time:**
   s 20.2 All work required by these contract documents shall be initiated after **April 1, 2015** completed no later than **August 25, 2015**, except for final plantings.
   s 20.3 Final plantings, turf establishment, and all project cleanup of punchlist items are to be completed for consideration of "Final Completion". All plantings work shall be fully completed no later than **October 15, 2015**.

2. **Revise Schedule of Prices**
   The Bidder shall strike a line through and add the following text to the item
   - 2401.512/03636~~7~~ **A** BRIDGE SLAB CONCRETE (3Y36**A**) (P)

3. **Added Landscaping Special Provisions**
   The attached landscaping special provisions shall be considered as included in the contract proposal.

Russell J. Kelm

Russ Kelm, PE,
This addendum is 18 pages

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SBL-1 CONTACT INFORMATION

Questions regarding this work related to the bridge landscaping and irrigation system, including any questions prior to bidding, shall be directed to Todd Halunen, PLA, Kimley-Horn and Associates, (651) 643-0448.

SBL-2 (1806) DETERMINATION AND EXTENSION OF CONTRACT TIME

The provisions of Mn/DOT 1806 are hereby deleted for the Determination and Extension of Contract Time for Plant Installation Mn/DOT 2571 and Turf Establishment Mn/DOT 2575 and the following provisions are substituted therefore:

Construction is scheduled for April 1thru August 25, 2015. Plant installation is intended for fall 2015. Preparation of planting holes and beds may be completed prior to the appropriate Plant Installation Period (PIP).

The Engineer may suspend or extend any Plant Installation Period (PIP) or Season of Planting (SOP), depending on the Engineer's assessment of planting conditions. If it is necessary to suspend a PIP or SOP before the work is complete, the Contractor may use time remaining in the suspended PIP or SOP to complete work in the next appropriate PIP or SOP. If a PIP or SOP concludes without the work being complete, the Engineer may extend the time allowed to complete the plant installation to the next appropriate PIP or SOP only to the extent that the Contractor can demonstrate the delays encountered were beyond the Contractor's control. The extension of time will be in proportion to the original time allotted to complete the work.

The Contract Time, for all other work not previously exempted herein, will be determined in accordance with the provisions of Mn/DOT 1806.

SBL-3 (1807) FAILURE TO COMPLETE THE WORK ON TIME

Liquidated damages will be assessed in accordance with the provisions of Mn/DOT 1807 except as modified below:

The Contractor will access a daily charge on a Calendar Day basis, for each day that any plant installation and establishment work (including mulching) remains uncompleted after expiration of the Contract Time, as determined and extended, in accordance with the provisions of Section SBL-2 (DETERMINATION AND EXTENSION OF CONTRACT TIME) of these Special Provisions. The City will base the daily charge on the original Contract value for all plant installation, turf restoration and establishment work and will assess in the amount shown in the Schedule of Liquidated Damages for that value.

If separate completion dates are specified for different species of plants or Plant Installation Periods, or Seasons of Planting, liquidated damages as set forth in the foregoing will apply separately to each of the planting operations and may be assessed concurrently

SBL-3.1 GUARANTEE

The Contractor shall be held responsible for any and all defects in workmanship and materials, which may develop in any part of the entire installation furnished under this contract. Upon written notice by the Engineer; the Contractor shall immediately replace, without expense to the Owner, any such faulty

parts and material installed not in accordance with these plans and specifications until the date of Final Acceptance. "Final acceptance" shall be defined as the date of issue of the final estimate.

SBL-3.2 COORINATION WITH OTHER CONTRACTORS AND UTILITY COMPANIES

Cooperation and coordination with other Contractors, and Utility Companies, working in the area of this construction will be necessary for the successful completion of this project. Efforts relating to this coordination will be considered incidental to the costs of the project.

SBL-4 (2212) DRAINABLE AGGREGATE BASE TYPE OGAB (CV)

This work shall consist of constructing a Drainable Aggregate Base (OGAB) layer at the bottom of the bridge planters. It shall be placed in conjunction with a geotextile fabric and drainage pipes to allow free movement of water through the planting soil, into the pipes and out through the drainage system.

I. Material Requirements

A) Open Graded Aggregate Base (OGAB) shall meet the requirements of Mn/DOT 2212.

B) Geotextile

The geotextile shall meet the requirements of Mn/DOT 3733, Type 5 (non-woven).

II. Construction Requirements

A) Handling and Placement

1) Handling and stockpiling shall be minimized to reduce segregation.
2) Placement material using skid loader or other approved machinery in one lift after all drainage pipe has been placed and tested.
3) Equipment for placing the OGAB shall be capable of uniformly depositing and spreading the material, without segregation, to the required thickness. At the time of placement, the aggregate shall have a moisture content of approximately 3-5 percent to minimize segregation.

B) Compaction

1) Hand tamp OGAB to lock rock in place prior to placing geotextile and Loam Topsoil Borrow (special).

C) Geotextile Placement

1) Geotextile Filter Type 5 (non-woven) shall be placed above the Drainable Aggregate Base (OGAB) and below the Loam Topsoil Borrow (Special). Zip ties necessary to secure the geotextile to the solid drainage pipes shall be considered incidental to the price of geotextile.

SBL-5 DAMPPROOFING

Dampproofing shall be Sealmastic Emulsion, Type II brush on ashalt based, clay emulsion with fibers specifically formulated to create a tight form resistant to water meeting ASTM D 1227, Type II, Class I requirements and manufacturerd by W. R. Meadows or approved equal. Thickness shall be 1/16" minimum and up to 1/8" depending on the roughness of the concrete.

APPLICATION

Surface Preparation All surfaces to be coated must be thoroughly cleaned of all scale, loose mortar, dust, rust, dirt, oil, grease and other foreign matter. Use a wire brush, sandblast or other method in keeping with good construction practices. Before product application, fill voids, cracks and holes in concrete with cement mortar and allow to dry. Primer: Use Sealmastic Spray-Mastic if required, manufactured by W. R. Meadows or approved equal. Do not apply when temperatures below 35° F (2° C) are anticipated. Do not apply in rain or when rain is threatening.

Mixing TYPE II (brush-grade) should be thoroughly stirred in the container prior to application. Apply by soft bristle brush. Dampproofing should be applied to properly prepared surfaces in a continuous, unbroken film, free of pinholes, filling and spreading around all joints, slots and grooves and penetrating into all crevices, chases, reveals, soffits and corners. Carry coating over the edge of the membrane waterproofing and up to the bottom of the wall cap or that equal level on the railing walls.

BACKFILLING

Backfilling should be done within 24 to 48 hours after application. No longer than seven days maximum should elapse. Be careful not to damage or rupture the film or displace coating or membranes. To assure maximum protection, use Protection Course from W. R. Meadows or approved equal. Prolonged exposure to ultraviolet light should be minimized.

SBL-5.1 Measurement and Payment

Dampproofing will be measured and payment will be made under Item 2481.618 (Dampproofing) at the Contract bid price per square foot (SF), which shall be compensation in full for all costs incidental thereto. Primer and Protection Course shall be considered incidental to the work.

SBL-6 (2481) MEMBRANE WATERPROOFING

The provisions of Mn/DOT 3757 are supplemented and/or modified with the following: Membrane Waterproofing shall be placed over all expansion joints in the bridge planters up to the bottom of the wall cap.

SBL-6.1 Measurement and Payment

Membrane Waterproofing will be measured and payment will be made under Item 2481.501 (Joint Waterproofing) at the Contract bid price per linear foot (LF), which shall be compensation in full for all costs incidental thereto.

SBL-7 PLANTER DRAINAGE

The provisions of Mn/DOT 3245 Thermoplastic Pipe are supplemented and/or modified with the following:

SBL-7.1 Schedule 40 Perforated PVC Pipe (Solid)

All PVC Schedule 40 pipe shall be manufactured from Type I, Grade I Polyvinyl Chloride (PVC) compound with a Cell Classification of 12454 per ASTM D1784. The pipe shall be manufactured in strict compliance to ASTM D1785 and D2665 (where applicable), consistently meeting and/or exceeding the Quality Assurance test requirements of these standards with regard to material, workmanship, burst pressure, flattening, and extrusion quality. The pipe shall be manufactured in the USA, using domestic materials, by an ISO 9001 certified manufacturer. All pipe shall be stored indoors after production at the manufacturing site until shipped from factory and solvent welded per ASTM D2564 and per the manufactures' recommendation.

Install pipe with filter fabric (sock) meeting Mn/DOT 3733 Geotextiles Type I fabric. The pipe shall be manufactured and delivered with the filter fabric included (commonly known as pipe with sock). Use zip ties to affix to adjacent drainage pipe, tees and elbows where necessary.

SBL-7.2 Schedule 40 Solid PVC Pipe (Solid)

Pipe and fittings shall be manufactured from PVC compound with a cell class of 12454 per ASTM D 1784 and conform with National Sanitation Foundation (NSF) standard 14.

All pipe and fittings to be produced by a single manufacturer and to be installed in accordance with manufacturer's recommendations and local code requirements. Testing with compressed air or gas may result in injury or death. Solvent cements shall conform to ASTM D 2564. Primer shall conform to ASTM F 656. The system to be manufactured by Charlotte Pipe and Foundry Co. or approved equal and is intended for non-pressure drainage applications where the temperature will not exceed 140°F.

SBL-8 IRRIGATION SYSTEM

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

1. **Scope of Work**

   A. **Irrigation System**: Furnish and install the complete underground irrigation system specified herein from new 4" stub from existing 8" water main (approximate location in design documents – field verify exact location) to include backflow, meter and booster pump throughout site; including labor, materials, equipment, apparatus, and services for the testing, adjusting, retesting and readjusting as required to place the system in an approved operating condition.

2. Unless otherwise specified, the specifications are intended to include everything requisite and necessary for the proper installation and completion of the work whether each necessary item is mentioned herein or not.

3. Any Contractor alterations to the specifications must be approved by the Owner and Consultant in writing a minimum two weeks prior to bid opening; if not, Contractor's bid may be disqualified.

4. Irrigation System shall include the following:
   a) Source Location – as indicated in design documents. Contractor to field verify exact location

of 8" main for 4" wet tap. Provide connection to main per local codes.

b) Contractor to provide Backflow device, meter, booster pump and enclosure.
c) Booster Pump – Contractor responsible for the complete installation of the pump, power & wiring, and all coordination required with associated trades.
d) Control System
   - Toro Sentinel Decoder Controller
   - Contractor responsible to establish connection to existing Sentinel Central Control computer and to make any field adjustments necessary to achieve operation.
   - Remote Control – coverage of the entire site
e) Piping, HDPE main line, Sleeving
f) Drip irrigation components
g) Valves and Valve boxes
h) Control wiring
i) Fittings
j) Electrical connections
k) Quick-couplers
l) All other necessary accessories
m) System Manuals
n) Instructional walk-through with Owner

5. Limits of work: Area within project limits as delineated on the landscape plan.

6. Related Sections: The following Sections contain requirements that relate to this Section:
   a. Section 02318 – Excavating, Backfilling & Compaction
   b. Section 02900 – Landscaping

1.3 QUALITY ASSURANCE

A. Irrigation contractor must be able to provide "Verifiable Documentation" that they have the technical qualifications, experience, trained personnel and facilities to perform the specified work and have been engaged in sprinkler design and installation, of systems of similar size and scope for a minimum of five years. Contractor must submit, along with bid, a list of five projects of similar scope completed within the last three years, failure to submit all documents at time of bid may cause bid to be rejected.

B. As a prerequisite of qualification to bid, the irrigation construction company shall provide verifiable documentation that such person and company is licensed by the Minnesota State Board of Electricity as a Technology Systems Contractor and that company employs not less than one Power Limited Technician and that such licenses are considered "in good standing" by the Minnesota State Board of Electricity. "Verifiable Documentation" shall include but not be limited to submission of copies of Technology System Contractor and Power Limited Technician credentials and proof of insurance.

D. Quality Control Criteria:
1. Provide irrigation products as described in this specification and according to manufacturer's specifications.
2. Comply with requirements of the State of Minnesota for prevention of backflow and back-siphonage.
3. Comply with requirements of the State of Minnesota for plumbing and other regulations affecting site irrigation.

4. Comply with National Plumbing Code, National Electric Code, and all other applicable city or state codes.

1.4 SUBMITTALS

A. General: Submit the following according to the Conditions of the Contract and Division 1 Specification Sections.

B. Submit design/build plans for approval prior to installation based on the requirements of this specification.

C. For purposes of these specifications; Products only as listed on design documents, submit all other products for approval a minimum of 10 days prior to bid date.

C. Submit manufacturer's literature, technical data, and recommendations for the system as specified including:

1. Pipe
2. Fittings
3. Valves
4. Controller
5. Backflow preventer
6. Wiring
7. Valve boxes

D. Closeout Submittals – Submit the following:

1. As-built drawings: Following construction of system, submit two (2) reproducible hard line sets of as-built drawings and an electronic copy (AutoCAD release 2007 or newer).

E. Submit color-coded print of controller chart including zone descriptions, locations and suggested run times.

1.5 JOB CONDITIONS

A. Contractor shall carefully examine the work site, local conditions, specifications and plot plan for any existing conditions and limitations that may apply to the work. Submission of a proposal shall be considered evidence that an examination has been conducted and that any questions and/or concerns have been satisfied.

B. Utilities: Determine location of utilities and perform work in a manner which will avoid possible damage. When necessary the Contractor shall make any minor adjustments in location or alignment of the new work. Hand excavate, as required. Maintain grade stakes set by others until removal is mutually agreed upon by parties concerned. Contact Owner if potential conflicts are apparent.

1.6 SEQUENCING AND SCHEDULING

A. Schedule and coordinate to facilitate the most expeditious completion of the project in a workmanlike manner.

B. Consult all other relevant specification sections to determine the extent of work specified elsewhere but related to that included herein.

C. Schedule and coordinate all required irrigation utility connections with other project trades and/or utility companies.

D. Obtain information pertaining to location of all proposed lines and accessories prior to irrigation installation.

E. Contractor shall assume responsibility for locating all site utilities, and perform work in a manner to avoid damage.

1.7. PROTECTION OF EXISTING CONDITIONS

A. Any existing structures, equipment, utilities, pavement, landscaping, etc., damaged by Contractor during the course of the work including any subsequent damage caused by leakage or settling of piping shall be restored at Contractor's expense.

1.8 HANDLING

A. Deliver irrigation system components in manufacturer's original undamaged and unopened containers with labels intact and legible.
B. Deliver plastic piping in bundles, packed to provide adequate protection of pipe ends, both threaded and plain. Pipe and accessories shall be handled in such manner as to ensure delivery to the trench in sound, undamaged condition. Before installation, the pipe shall be inspected for defects. The interior of pipe and accessories shall be thoroughly cleaned of foreign matter before being lowered into the trench and shall be kept clean during laying operations by plugging or other approved method.
C. Store and handle materials to prevent damage and deterioration.
D. Provide secure, locked storage for valves and similar components that cannot be immediately replaced to prevent installation delays.
E. Manufacturer's Specifications: The latest printed specifications of approved manufacturer of materials shall become part of these specifications.

1.9 EXTRA MATERIALS

A. Provide extra materials as follows:
21. Two valve keys for manual valves
32. Two Quick-Coupler Keys with hose swivels.
43. Two wrenches for each type head core and removing and installing each type head.

PART 2 - PRODUCTS

2.1 MAIN LINE

A. Piping on pressure side of irrigation control valves:
1. Centennial Plastics (or equal) CenFuse HDPE 160 PSI, SDR 11, and conform to ASTM standards. Only heat fused joints acceptable under any hardscape surface.

2.2 LATERALS

A. Piping on non-pressure side of irrigation control valves:
1. Polyvinyl chloride (PVC) 1120-1220, SDR 22 Class 200, and conform to ASTM standards D2241-05 & D2672 or latest revision. Materials shall conform to all requirements of D1784, or latest revision.
2. Pipe 1-1/4" and smaller pipe may also be flexible non-toxic polyethylene pipe made for 100% virgin material meeting N.S.F. (National Sanitation Foundation) standard #14 for use in pressure potable water applications, for 800 design stress. All sizes shall have a minimum 100 P.S.I. working pressure rating. All polyethylene pipes shall be continuously and permanently marked with the manufacturer's name, material, size, and schedule. Pipe shall conform to A.S.T.M., D2239, and D1248 (3C5PE34) or latest revision.
3. Centennial Plastics (or equal) CenFuse HDPE 160 PSI, SDR 11, and conform to ASTM standards. Only heat fused joints acceptable under any hardscape surface. HDPE piping may be used in all lateral applications. If HDPE is used sleeving is only required under

road/approach crossing but no joints (other than fusion welded) will be allowed under any hardscape areas.

2.3 FITTINGS

A. Fusion welded joints in main line, and laterals if applicable, under all hardscape surfaces. Compression fitting in main line allowed only in valve box locations.

B. Burst strength of fittings shall equal or exceed that of the pipe on which they are installed.

2.4 CONTROL VALVES

A. Remote control valves shall be Rain Bird XCZ-100-PRB-COM. Valves shall have Heavy-duty solenoid, High grade construction (220psi rating), Internal and External manual bleed, Flow control with non-rising handle, Rigid diaphragm support, Fabric reinforced diaphragm, Globe and angle configurations, Captive bonnet bolts and solenoid plunger and pressure regulator compatible.

2.5 CONTROLLERS

A. Provide a Toro Sentinel Decoder Controller that fulfills the intent outlined in the summary.
B. Sentinel ESB-SSAKTW-100-SS-WS4
- Remote Control Kit SHHR – coverage of the entire site (provide radio site survey)

C. Mount the controller in such a way as to simplify the programming/visibility of the controller. Contractor to ensure controller are grounded to 10 OHM or less. Verify the exact location with the Owner and/or Consultant while still adhering to the manufacturer's recommendations.

2.6 QUICK-COUPLING VALVES

A. Provide quick coupling valves as shown in design documents.
B. Provide two (2) valve keys fitted with 3/4" swivel hose cells.
C. Quick Coupling Equipment:
1. Valves: One-piece body constructed from heavy-duty cast bronze with a 1" FIP riser connection.
2. Quick Couplers: Single lug coupler of heavy cast bronze and detachable handle.
3. Swivel Hose ELL: Heavy cast bronze, connected to quick couplers for hose connection. Hose ells 1" FIPX 1" Male Hose Threads.
4. Each quick coupler should be installed in a valve box by Carson (or approved equal) and packed with pea gravel, 4" in depth.

2.7 VALVE BOXES

A. Provide box and cover, with open bottom and openings for piping; designed for installing flush with grade. Include size as required for valves and service – 10" round minimum. The box shall be of plastic construction with UV protection. Boxes shall be vandal resistant including lockable lid. Permanently label valve box cover with zone number. Box and lid assembly color shall be green color.
B. All drip valve assemblies shall be contained in 12" rectangular box, one valve per valve box.

C. Accepted manufacturers: Carson.
D. All valve boxes shall be permanently labeled with brass/stainless tag indicating zone number and/or equipment enclosed.

2.8 CONTROL WIRE

A. Electrical control wires shall be minimum of #14 gauge wire - #12 gauge on any run over 2000 feet. .
B. Each irrigation control valve shall have its own decoder.
C. The wire path shall be grounded to 10 ohm or less. All future wires stubbed from initial installation must run from controller and installed in a valve box. Future wires shall be a different color than initial "field" wires. Six to ten feet of extra wire shall be left at controller and valve box location.

2.9 BACKFLOW PREVENTER

A. As shown in design documents and be in accordance with local codes, and adequately sized for the irrigation system.

2.10 RAIN SENSOR

A. Rain sensor shall cut power supply between timer-controller and 24V solenoid valves after rainfall quantities of 1/8", 1/4", 1/2", 3/4" or 1". Sensor shall be accurate to within + 1/1 6" and will restore power after 2-20 hours, depending on conditions. U.L. listed switch rating of 10.1 amps, 1/4 H.P. at 125/250 VAC.
B. The device shall be mounted in a location unobstructed by walls, trees, or other hindrances (as not to be vandalized).

2.11 MANUAL VALVES

Manual valves shall be bronze gate type. Manual valves shall be sized according to the line size they are being installed on.
Manual valve location(s) - refer to Landscape Architect

2.12 REMOTE CONTROL

Provide a Toro SHHR Remote Control. Contractor to verify operation of the remote control over the entire site and make any adjustments necessary to ensure uninterrupted coverage of site.

2.13 DRIP IRRIGATION

A. Drip pipe and all components are to be specifically manufactured for underground drip irrigation by Hunter.

B. System is to be self-cleaning, pressure compensating, purple in color and UV resistant. Drip line shall be buried a minimum of 4" and a maximum of 6" deep in planting soil. Staple drip lines a minimum of every four feet and at every change in direction. All "headers" for drip line shall be PVC – minimum 1".

C. At least one shut-off valve, flush valve, Toro Operation Indicator and Disc filter is to be installed at each drip irrigation bed.

D. Drip valve assemblies shall be placed in a 12" rectangular valve box – one valve per valve box.

2.14PUMP STATION

A. Aqua Mark 3HP Booster Pump Model #AM-50V
B. Single Phase 208-240V
C. Variable Frequency Drive
D. 36psi boost at 50gpm
E. PSI Drop Start

PART 3 - EXECUTION

3.1 PERMITS, LICENSES AND CERTIFICATES

A. The Contractor shall procure all permits and licenses, except as otherwise indicated, pay all charges and fees and give all notices necessary and incident to the proper and lawful prosecution of the work. He shall also obtain and supply the Owner all certificates required to show that the work has been performed in accordance with the building, plumbing, other authorities, the Board of Fire Underwriter's, or such other like bodies, as the specifications may require directly or by implication.

B. When the work performed affects the property of facilities of public utility or other corporations or of private persons, he shall obtain and supply from such corporations or person if required, statements that the work has been performed satisfactorily so far as their interests are affected and that all claims therefore have been settled by the Contractor.

3.2 RIGHTS OF WAY

The Contractor shall acquire the necessary right of way or lawful authority that may be necessary for approved crossings or occupation of any roads, street or alleys upon which the contract work will be done.

3.3 UNDERGROUND STRUCTURE

A. The Contractor shall be responsible for all necessary information regarding the exact location of existing underground structures and utilities and shall mark their location, at the site.

B. The Contractor shall be liable for the damages to and the cost of repairing or replacing any buried conduit, cables or piping encountered during the installation of the work, unless they were not marked or the Contractor was not previously informed of such underground utilities. If the Contractor is aware of such utilities, he shall immediately have the incurred damages repaired at his own expense. Conversely, the Owner shall be liable for the cost of repairing to any of those existing utilities of which the Contractor had not been previously informed.

3.4 EXCAVATING AND TRENCHING

A. Perform excavations as required for installation of work. Restore all surfaces, existing underground installations, etc., damaged or cut as a result of the excavations, to their original condition.

B. Dig trenches wide enough to allow a minimum 6" between parallel pipelines. Trench sufficient depth to provide minimum cover (18" for all main lines and 12" for all laterals) from finish grade as shown on drawings.

3.5 SLEEVING

A. Install sleeves where any control wire and/or pipe pass through or under walls, walks or bridge structure.

B. Install sleeves for control wiring and pipe under walks and paving.

C. HDPE Main line shall be placed in sleeving that is a minimum of two sizes larger than pipe contained. Lateral line sleeving shall be a minimum of two pipe sizes larger than pipe contained.

D. Sleeves to be provided and extend a minimum of 12" beyond edges of walls, walks, and paving.

E. Mark the sleeve ends with an iron post.

F. Place wires in separate sleeve (1 ½" minimum).

G. Coordinate sleeve installation with other trades as required.

3.6 PIPE INSTALLATION

A. Install pipe in accordance with manufacturer's instructions.

1. Solvent-weld PVC pipe and fittings, using primer, solvents, and methods recommended by manufacturer, except where screw connections are required. Clean pipe and fittings of dirt and moisture before assembly. Snake pipe from side to side of trench bottom to allow for expansion and contraction. Make all connections between PVC pipe and metal valves or pipe with threaded fittings using PVC male adapters.
2. Use Teflon tape only on threaded joints, plastic to plastic and/or plastic to metal. Assemble threaded PVC fittings finger-tight plus one to two turns - no more.

B. Install thrust blocks on main lines (larger than 2 ½") at locations that make a change of direction.

C. Avoid following piping layout situations:

1. Avoid piping layout along sides of structures.
2. Avoid odd angles in piping layout.
3. Avoid unbalanced friction losses.
4. Avoid high friction losses.
5. Avoid excessive trenching.

3.9 ZONE VALVES

A. Remote Control Valves: Install control valves in valve boxes where shown and group together where practical. Place no closer than 12" to walk edges, buildings, and walls. Set valve boxes flush with finish grade.

B. Drip valve assemblies shall be placed in a 12" rectangular valve box – one valve per valve box.

3.10 CONTROLLERS

A. Install per local code and manufacturer's instructions.
B. Connect remote control valves to controller in clockwise sequence to correspond with station setting beginning with Stations 1, 2, 3, etc.
C. Affix a non-fading copy of irrigation diagram to cabinet door. Irrigation diagram to be sealed between two sheets of 20 mil (min.) plastic. Irrigation diagram shall be a copy of the as-built drawing and shall show clearly all valves operated by the controller, showing station number, valve size, and type of turf/planting irrigated.
D. Exact field location of controllers to be verified before installation. Coordinate the electrical service to these locations.
E. Provide a Rain Sensor for each controller; coordinate locations with Owner.

3.11 CONTROL WIRING

A. Install control wires with sprinkler mains and laterals in common trenches wherever possible. Lie to the side of pipeline and tie wires in bundles at 10' intervals and allow slack for contraction between ties. Provide one decoder address for each zone.
B. Provide a minimum of 3' of looped extra ground and control wire at each valve and at 200' intervals on long wire runs. Snake wires in trench to allow for contraction of wires.
C. Control wire splices at remote control valves to be sealed with a Direct Burial Splice Kit - 3M DBY-6/DBR-6.

3.12 VALVE BOXES

A. All valve boxes shall be supported in the ground by using paver style bricks in every corner or side.
B. Provide valve box detail on submitted plan for approval.
C. Provide sufficient clearance (minimum 4") between valve box cover and the automatic valve, to prevent damage if the valve box is driven over.
D. Wood supports of any kind are not allowed.
E. All valve boxes shall be permanently labeled with brass/stainless tag indicating zone number and/or equipment enclosed.

3.13 IMPROPERLY OPERATING OR LOCATED EQUIPMENT

Any equipment which fails to operate properly and/or is located incorrectly shall be promptly corrected or relocated at the Contractor's expense. If the Contractor wishes to make any field changes, he must receive written permission from both the Owner and Consultant.

3.14 THRUST BLOCKS

Provide thrust blocks at all changes in size or direction of mainline piping (3" and larger unless otherwise specified). Elbows, reducers, plugs, and the opposite side of tee branches all require thrust blocks. Concrete thrust blocks are constructed by pouring concrete between the fitting and the undisturbed bearing wall of the trench.

3.15 FLUSHING AND TESTING

A. Cap or plug all openings as soon as lines have been installed to prevent entrance of materials that would obstruct the pipe. Leave in place until removal is necessary for completion of installation.
B. Thoroughly flush out all water lines before installing valves and other hydrants.
C. Testing: All instruments, equipment, facilities, and labor required to conduct the tests shall be provided by Contractor. Piping shall be tested hydrostatically before backfilling and proved tight at a hydrostatic pressure of 100 psi without pumping for a period of one hour with an allowable pressure drop of 5 psi. If

hydrostatic pressure cannot be held for a minimum of 4 hours, Contractor shall make adjustments or replacements and the tests repeated until satisfactory results are achieved and accepted by the Owner.

3.16 BACKFILL AND COMPACTING

A. After system is operating and required tests and inspections have been made, backfill excavations and trenches with clean soil, free of rubbish.
B. Backfill for all trenches, regardless of the type of pipe covered, shall be compacted to minimum 95% density under pavements, 85% under planted areas.
C. Compact trenches in areas to be planted by thoroughly flooding the backfill. Jetting process may be used in those areas.
D. Dress off all areas to finish grade.

3.16CLEANUP

A. Keep areas of work clean, neat, and orderly at all times. Keep paved areas clean during installation. Clean up and remove debris from the entire work areas prior to final acceptance.
B. Protect irrigation system and materials from damage due to performance of work, operations by other contractors, trades and trespassers. Maintain protection during installation and testing period.
C. The Contractor shall be responsible for all damage caused by his operations to trees, turf, shrubs, curbs, paving, structures, utilities, etc., on the site or adjacent to the site of the work and shall repair, replace or otherwise make good any damage caused by their work.
D. The Contractor shall check the system two weeks after acceptance and four weeks after acceptance. The Contractor shall drain the system in the fall following installation, turn it on and completely checking the entire system in the spring following installation.

3.17 WINTERIZATION AND SPRING START-UP OF IRRIGATION SYSTEM

A. The contractor shall prepare the entire irrigation system for one winter by removing all water within the mainline and lateral piping. Water shall be diverted so as not erode existing landscaping or final grades. If damage does occur, the contractor shall make repairs to the owner's satisfaction at no additional cost.
B. The contractor shall provide one Spring Start-up of the entire irrigation system by filling the mainline and lateral piping with water and operate all control valves with the automatic controller. The contractor shall also set the controller timing for spring irrigation.
D. During Wintering and Spring Start-up the contractor shall contact the owner and current landscape maintenance provider responsible for the project site and educate them to the operations of the system. Also, the contractor shall provide a written copy to the owner of the irrigation timing required for establishing plants during late spring, summer and fall schedules.
E. The contractor shall coordinate and assemble a written instruction manual that indicates step by step the winterizing and start-up operations. The instructions shall be included in the O & M manuals.

PART 4 - ACCEPTANCE

4.1 ACCEPTANCE

A. Demonstrate operation of all irrigation zones for the Owner and/or Consultant, a current As-Built is to be provided to the Owner/Consultant for purposes of the walk-thru. All irrigated areas are to have 100% coverage. Contractor shall add additional drip line, as necessary, at no cost to the Owner. All future visits required by the Consultant, after initial punch list, may be charged to the irrigation contractor.
B. A field training course shall be provided for designated operating and maintenance staff members. Training shall be provided for a total period of up to 12 hours of normal working time and shall start after the sprinkler system is functionally complete and major adjustments to controller, due to establishment of

materials, is substantially complete. Field training shall cover all of the items contained in the operating and maintenance manuals.

C. The Contractor will provide on-site consultation with the Owner's operating personnel for a period of 6 months, not to exceed 4 hours per month, at no cost to the Owner. This consultation will be provided at the Owner's request.

4.2 GUARANTEE

A. The entire sprinkler system will be unconditionally guaranteed against defects in material and workmanship, including settling of backfilled areas below grade for a period of one year form date of acceptance.

B. In addition to minor adjustments, any defective electrical controls, valves, or other working parts will be repaired or replaced without cost to the Owner for a period of one year from date of acceptance.

C. Contractor to provide one winterization, including spring start up of irrigation system.

D. Damage by others during the one-year guarantee period will be the Owner's responsibility.

4.3 RECORD INFORMATION

A. Furnish record drawings of the complete irrigation system.

B. Record Drawings and Controller Chart:

1. Provide a complete set of up-to-date as built drawings, and an electronic copy (AutoCAD release 2007 or newer).
2. Prepare a controller chart showing:
   a. Location of all sections, valves, lateral lines, and routes of control wires.
   b. Identify all valves as to size, station, number, and type of irrigation.
   c. Provide chart as a black-line print with a different color used to show area of coverage for each station.
   d. Locate chart inside controller door. Seal chart between two pieces of plastic.
   e. Provide suggested irrigation schedule at time of acceptance.
   f. Complete chart and receive approval prior to final inspection of irrigation system.

4.4 MEASUREMENT AND PAYMENT

A. Measurement for the irrigation system will be the lump sum for the complete system installed in accordance with the contract documents.

B. Payment for irrigation system will be measured and payment will be made under Item 2504.601 (Irrigation System) at the Contract bid price per lump sum (LS), which shall be compensation in full for all costs incidental thereto irrigation system shall be full compensation for all labor, materials, tools, equipment and supervision required to furnish and install a complete automatic irrigation system. The lump sum price shall include; but not limited to, the material and installation of irrigation piping, pipe fittings, valves, secondary wiring, sprinkler heads, control equipment, thrust blocks, valve boxes and sleeves, for all the proper operation of the system. Payment shall occur only after the complete system is accepted.

SBL-9 <u>2" INSULATION (INSULATION BOARD)</u>

The provisions of Mn/DOT 3760 are supplemented and/or modified with the following:

Insulation for the bridge planters shall be placed on the interior walls and adhered to the walls with approved mastic over the proposed dampproofing.

SBL-9.1 Measurement and Payment

2" Insulation (Insulation Board) will be measured and payment will be made under Item 2502.604 (2" Insulation) at the Contract bid price per square yard (SY), which shall be compensation in full for all costs incidental thereto.

SBL-10 (2571) PLANT INSTALLATION

The provisions of Mn/DOT 2571 are supplemented and/or modified with the following:

Mulch shall be double-shredded hardwood type.

Delete Section 2571.3K.1 and replace with the following: A Plant Establishment Period (PEP) of 1 calendar year begins on the date that initial planting operations on the project are completed and continues until final acceptance of the project, unless otherwise shown on the plans.

Delete 2571.5F Bonus Payment.

SBL-11 (2575) ESTABLISHING TURF AND CONTROLLING EROSION

Mn/DOT 2575 is modified as follows:

SBL-11.1 Item 2575.512 "Mulch Material, Type 6" is changed to "2575.513 "Mulch Material Type 6".

SBL-11.2 Item 2575.570 is changed to "Rapid Stabilization Method 3" by the acre [hectare].

SBL-12 (3882) MULCH MATERIAL

SBL-12.1 In 3882.2 at the end of the Type 6 paragraph, insert the following:
Gradation test samples are required for Type 6 Mulch (tub-ground, hammer-milled or mechanically chipped wood). Submission of one Type 6 mulch sample will be required for gradation test and must be specific to every individual source/supplier of Type 6 mulch that the Contractor intends to use on the Project.

SBL-12.2 Measurement and Payment

Mulch Material will be measured as a placed volume as specified in Mn/DOT 3882. Payment will be made under Item 2575.513 (Mulch Material Type 6) at the Contract bid price per cubic yard, which shall be compensation in full for all costs incidental thereto.

SBL-13 SELECT TOPSOIL BORROW (SPECIAL) LV

The work shall consist of mixing and placing the Select Topsoil Borrow (Special) LV in the bridge planters. Planters shall be filled with Select Topsoil Borrow (Special) LV per Mn/DOT 3877 and shall be in accordance with the provisions of Mn/DOT Section 3138 except as modified below:

Qty (% Volume)	Description	Spec	Function
10	Grade 1 Compost	3890	Limit Compaction, Biological Process
50	Topsoil Borrow	3877	Filler
25	Sieved 1 to 2 Inch Angular Rock	3601	Weight and Drainage
12	Sieved Sand	Provision	Drainage/Porosity
	Fertilizer	Provision	Plant Food
3	Polypropylene Mesh Fibers	Provision	Microreinforcement, Increase Soil Tension
	7.0 $\pm$ 0.5 PH Adjustment	Provision	Desire 6.5 to 7.0

Base Planter Area	Siltation Fabric	Provision	Prevent Drainage Plug
6 Inch Base	Granular Fill/Base	3601	Drainage

The bridge planters are cast in place, limestone-faced and capped planters, waterproofed and with provisions for drainage (including riser clean-outs) and irrigation sleeving. Provide soil analysis for review and approval prior to placing of soils and installation.

The contractor shall inspect the planter's drainage system to insure proper drainage. Inadequate drainage shall be brought the attention of the Engineer prior to commencement of any work.

Verify that existing irrigation sleeving is free and clear of debris other than the irrigation mains/wiring. Place balled up filter fabric in voids around irrigation mains/wiring prior to placing soil to minimize the migration of soil into conduits.

Polypropylene mesh fibers shall be Netlon® or other approved equal. Mix fibers within planter soil per the manufacturer's recommended methods and at 50% of the recommended rates.

Following the placement of planter soils, evenly saturate soil with water. After 3 days, inspect soil settlement. Add additional soil as needed and required per the detail. Final grade after 30 days shall be within 4" of the bottom of the planter cap.

SBL-13.1 Measurement and Payment

Select Topsoil Borrow (Special) LV will be measured as a placed volume as specified in Mn/DOT 3138. Payment will be made under Item 2574.607 (Loam Topsoil Borrow (Special) LV) at the Contract bid price per cubic yard, which shall be compensation in full for all costs incidental thereto.